

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Canceled)

2. (Currently Amended) The controller of claim ~~4~~⁸, wherein the controlled device is utilized to perform a portion of an industrial process, the controller is an industrial controller, and the first program portion is a control program portion.

3. (Original) The controller of claim 2, wherein the control program portion is written in ladder logic code.

4. (Currently Amended) The controller of claim ~~4~~⁸, wherein the plurality of program portions additionally includes a fourth program portion that is base firmware stored in a read-only memory of the at least one storage medium, and wherein the base firmware is capable of receiving the first signals from the first program and formatting the first signals for transmission to the controlled device.

5. (Currently Amended) The controller of claim ~~4~~⁸, wherein the second program portion includes firmware extension programming.

6. (Canceled)

7. (Canceled)

8. (Currently Amended) A controller configured to operate as at least one agent, the controller comprising: at least one processing device; and at least one storage medium that is in communication with the at least one processing device, wherein the at least one storage medium stores a plurality of program portions that are executed by the at least one processing device, and wherein the plurality of program portions includes a first program portion capable of generating first signals that are commands to be provided to a controlled device; and a second program portion

capable of governing standard agent-type functionality; and a third program portion capable of governing application-specific agent-type functionality The controller of claim 7,

wherein the second program portion includes a planner that governs at least a portion of the standard agent-type functionality including creating and interpreting bid request messages and bid messages.

wherein the second program portion includes an execution controller that governs at least a portion of the standard agent-type functionality including translating plans of the planner into commands that can be provided to the first program portion, and

wherein the execution controller also monitors the first program portion and is capable of providing information regarding a status of the first program portion to the planner.

9. (Original) The controller of claim 8, wherein the monitoring of the first program portion by the execution controller occurs by way of at least one of polling the first program portion, event-driven monitoring, and sensing events that occur in relation to the first program portion.

10. (Original) The controller of claim 8, wherein the monitoring of the first program portion occurs by way of at least one of a generic interface that is also part of the second program portion and a data table.

11. (Currently Amended) The controller of claim 68, wherein the bid request messages and bid messages include scripts written in a language selected from the group consisting of JDL, XML and KQML.

12. (Currently Amended) The controller of claim 68, wherein the planner includes at least one of parsing/integration programming that allows the planner to process the bid request messages and bid messages, and subcontracting management programming.

13. (Original) The controller of claim 12, wherein the planner further includes wrapping/unwrapping software for formatting at least some of the bid request messages and the bid messages in accordance with a FIPA protocol.

14. (Original) A controller configured to operate as at least one agent, the controller comprising: at least one processing device; and at least one storage medium that is in communication with the at least one processing device, wherein the at least one storage medium stores a plurality of program portions that are executed by the at least one processing device, and wherein the plurality of program portions includes a first program portion capable of generating first signals that are commands to be provided to a controlled device; and a second program portion capable of governing standard agent-type functionality; and a third program portion capable of governing application-specific agent-type functionality. The controller of claim 6,

wherein the second program portion includes a planner that governs at least a portion of the standard agent-type functionality including creating and interpreting bid request messages and bid messages, and

wherein the second program portion is in communication with base firmware, wherein the bid request messages and bid messages that are created by the planner are provided to the base firmware, which is capable of formatting at least some of the bid request messages and bid messages for transmission onto a network according to a network protocol selected from the group consisting of Ethernet, ControlNet and DeviceNet.

15. (Currently Amended) The controller of claim 48, wherein the second program portion is capable of governing a downloading of at least some of the third program portion from a source other than the controller during development of a distributed control system of which the controller forms a part.

16. (Original) The controller of claim 15, wherein the second program portion further allows for remote activation and deactivation at least some of the agent-type functionality of the controller.

17. (Currently Amended) The controller of claim 48, wherein the second program portion operates in a priority-based manner and employs a Common Industrial Protocol, and wherein the controller serves as a bridge device between standard industrial networks and packing protocols and multi-agent system communication languages and logical networks.

18. (Currently Amended) The controller of claim 1-8 wherein the second program portion includes at least one directory facilitator.

19. (Original) The controller of claim 18, wherein each directory facilitator is capable of accessing a first data portion in which addresses corresponding to a first plurality of agents are listed, and a second data portion in which capabilities corresponding to a second plurality of agents are listed.

20. (Original) The controller of claim 19, wherein the second program portion includes both a local directory facilitator and a global directory facilitator, wherein the directory facilitators are permanent and generic components, and wherein the controller has employs any of a variety of protocols to organize intercommunications among the directory facilitators.

21. (Original) The controller of claim 19, wherein the second program portion includes a capability matcher that is capable of monitoring interactions among agents and identifying related clusters of agents.

22. (Original) The controller of claim 21, wherein the third program portion includes at least one of application-specific agent scripts portion, a diagnostics portion and an equipment model portion.

23. (Currently Amended) A controller configured to operate as at least one agent, the controller comprising: at least one processing device; and at least one storage medium that is in communication with the at least one processing device, wherein the at least one storage medium stores a plurality of program portions that are executed by the at least one processing device, and wherein the plurality of program portions includes a first program portion capable of generating first signals that are commands to be provided to a controlled device; and a second program portion capable of governing standard agent-type functionality; and a third program portion capable of governing application-specific agent-type functionality

The controller of claim 22,

wherein the second program portion includes at least one directory facilitator,

wherein each directory facilitator is capable of accessing a first data portion in which addresses corresponding to a first plurality of agents are listed, and a second data portion in which capabilities corresponding to a second plurality of agents are listed,

wherein the second program portion includes both a local directory facilitator and a global directory facilitator, wherein the directory facilitators are permanent and generic components, and wherein the controller has employs any of a variety of protocols to organize intercommunications among the directory facilitators,

wherein the third program portion includes at least one of application-specific agent scripts portion, a diagnostics portion and an equipment model portion, and

wherein the third program portion includes each of the application-specific agent scripts portion, the diagnostics portion and the equipment model portion, wherein the diagnostics portion is in communication with the first program portion, wherein each of the application-specific agent scripts portion, the diagnostics portion and the equipment model portion is in communication with a planner portion of the second program portion, and wherein the application-specific agent scripts portion is further in communication with an execution controller portion of the second program portion.

24. (Currently Amended) The controller of claim ~~48~~, wherein the plurality of program portions further includes a fourth program portion providing an operating system.

25. (Canceled)

26. (Original) A distributed control system for controlling a process performed by a plurality of controllable devices including first and second controllable devices, the distributed control system comprising: a network; and first and second controllers coupled to the network, wherein the first and second controllers include first and second processors, respectively, and first and second storage media, respectively; wherein first and second application-specific control programs are stored on the first and second storage media, respectively, the first and second control programs enabling the respective first and second controllers to generate commands to be provided to the first and second controllable devices, respectively; and wherein first and second agent-related programs are additionally stored on the first and second storage media, respectively, the first and second agent-

related programs each including agent-type programming to enable the first and second controllers to operate as agents, to communicate with one another via the network, and to interact with the first and second control programs to govern operations of the first and second controllable devices~~The distributed control system of claim 25, wherein the each of the first and second agent-related programs includes a first portion that provides for generalized agent functionality and a second portion that is specifically configured for operation in relation to at least one of a characteristic of the process, a characteristic of the first and second control programs, respectively, and a characteristic of the first and second controllable devices, respectively.~~

27. (Original) The distributed control system of claim 26, wherein the first portion of each of the first and second agent-related programs includes a planner and an execution controller, and the second portion of each of the first and second agent-related programs includes an application-specific agent scripts portion, a diagnostics portion and an equipment model portion.

28. (Original) The distributed control system of claim 27, wherein each of the planners interacts with at least one of a directory facilitator capable of providing agent address information and agent capability information, a capability matcher, parsing/integration software, and wrapping/unwrapping software.

29. (Canceled)

30. (Canceled)

31. (Canceled)

32. (Canceled)

33. (Canceled)

34. (Canceled)

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35. (Canceled)